Original Article

Knowledge and attitudes toward transgender health

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SUMMARY

Background: Hormonal interventions for transgender adolescents have become increasingly common; however, there is a paucity of research on medical student knowledge of, and attitudes toward, these interventions following didactic instruction. Furthermore, no studies have examined whether students can be aware of the literature on the mental health benefits of these treatments yet continue to find them unethical.

Methods: An anonymous online survey was administered to students, from first to fourth year (n = 407), who had received one or two lectures on the treatment of youths with gender dysphoria (GD).

Results: Surveys were completed by 162 respondents (40%). A majority was able to correctly answer questions regarding psychiatric co-morbidities, diagnostic criteria, hormonal interventions, long-term benefits of interventions and terminology. There was some evidence that precision in the use of terminology waned over time. Many were unclear on the role of puberty blockers and the time requirement for a diagnosis of GD. A minority (14%) reported a belief that hormonal therapy is unethical, although these same individuals recognised that these treatments have mental health benefits.

Discussion: Our results have implications for future instruction, including: the need to teach pharmacological and diagnostic issues more deliberately; providing refresher training on terminology; and relying on interactive discussion or patient visits, rather than didactic lectures alone, for ethically charged medical topics. Similar levels of knowledge among students who believe that hormonal therapy is ethical and unethical may indicate that imparting didactic knowledge about therapeutic benefits alone may not be sufficient to affect attitudes regarding endocrine care for transgender youth.

Hormonal interventions for transgender adolescents have become increasingly common

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There has been little study of medical student knowledge of, and attitudes toward, hormonal intervention for transgender adolescents

INTRODUCTION

Adolescents who experience incongruence between gender identity/expression and gender assigned at birth for at least 6 months may meet the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria for gender dysphoria (GD),[1] which may warrant hormonal intervention.[2,3]

Since the first US clinic dedicated to paediatric transgender health opened in 2007 at Boston Children's Hospital, the numbers of transgender patients seeking medical intervention have steadily increased in the USA and abroad.[4] Guidelines for hormonal treatment of paediatric patients are delineated in the 2017 Endocrine Society Guidelines,[3] and by the World Professional Association for Transgender Health.[2] Medical intervention generally involves the use of gonadotropin-releasing hormone analogs (GnRHas), or 'puberty blockers', once patients reach Tanner stage 2/3 of pubertal development (i.e. early breast budding or increased testicular volume).[3] These medications prevent the development of sex characteristics that typically appear in puberty, allowing patients time to decide if they would like to transition towards a physical appearance more consistent with their gender identity. Later interventions include cross-sex hormones (oestrogen or testosterone) to achieve the physical/pubertal changes of the identified gender, typically at the age of 16 years,[3] although these may be initiated earlier in select cases.[5]

Paediatric patients with GD have high rates of anxiety, depression, self-harm and suicidal ideation.[4] In an important study in the Netherlands, psychological improvements were evident among individuals who received GnRHa and cross-sex hormone therapy in conjunction with psychological support.[6] Followed as young adults after gender-affirming surgery, these patients had global functioning on a par with the general population in the Netherlands. Based on these results, the US National Institutes of Health funded the largest study to date on the benefits of such interventions.[7] Benefits are thought to outweigh drawbacks, which include: paediatric patients falling behind on bone age with GnRHa therapy, although they 'catch up' in bone age after receiving cross-sex hormones; and the possibility of hypercoagulability with oestrogen therapy.[3]

There has been little study of medical student knowledge of, and attitudes toward, hormonal intervention for transgender adolescents. The relationship between didactic teaching about interventions and medical students' beliefs about the ethics of hormonal therapies remains unknown.

Yale School of Medicine instituted a curriculum on transgender paediatric patient care, with a mandatory lecture in both a first-year introductory clinical skills course and a subsequent paediatrics clerkship (see Table 1.) This exploratory study aimed to evaluate student knowledge of GD and attitudes toward hormonal interventions after curricular participation.

METHODS

This study qualified for exemption under Yale University's Institutional Review Board. Participants provided informed consent via a statement at the beginning of the anonymous online survey.

In February 2016, a link to the survey was e-mailed to all Yale medical students from first to fourth year (n = 407). Demographically, these students hail from widely diverse geographic and cultural backgrounds on an urban campus. Students were given 1 month to respond to the survey, with several e-mailed reminders. All students had received the first lecture, and the majority of third-year and all of the fourth-year students had received the second lecture. Seven knowledge questions (one with multiple components) were written based on the aforementioned guidelines and standards, and closely followed the key curricular topics. A single dichotomous choice item asked students whether hormonal therapy for transgender paediatric patients was ethical or unethical.

Statistical analyses were performed using SPSS. Frequencies and means were derived for the aggregate and by training year. One-way analysis of variance (ANOVA) determined the existence of statistically significant differences between mean scores by training year. Items with significant differences received post-hoc analysis (Tukey's test) that compared all possible pairs of means to determine where the differences existed at an alpha level of <0.05. Students' performance on knowledge items was compared with a dichotomous choice on the ethics question, using the Student's t-test.

RESULTS

The response rate of the students was 40% (n = 162). Outcome differences overall were not associated with year of training (see Table 2). Most were able to: correctly identify terminology associated with gender and sexuality (80%); recognise all psychiatric co-morbidities common in transgender youth (90%); correctly apply diagnostic criteria for GD in adolescents (85%); identify oestrogen and testosterone medical interventions (91% and 95%, respectively); and correctly identify the long-term benefits of medical management of GD in adolescents (80%). Areas of weakness included knowledge about GnRHa (65%) and spironolactone (38%) as therapies, and the time requirement to meet the diagnostic criteria for GD (36%).

Table 1. Curriculum on paediatric transgender health

Topic covered	Lecture 1	Lecture 2
Learning objective: recognise and use accepted terminology relating to gender identity and sexuality		
Terminology on gender assigned at birth, gender identity and sexuality	X	X (in brief)
Learning objective: recognise and understand diagnostic criteria for GD		
Overview of DSM-5 criteria for the diagnosis of GD in childhood	X	X
GD in adolescents and adults	X	X (in brief)
Learning objective: recognise psychiatric co-morbidities of GD		
Psychiatric co-morbidities and mental health concerns	X (in brief)	X
Learning objectives: recognise possible medical interventions for GD; understand guidelines/requirements for interventions; understand potential benefits and drawbacks of both administering and withholding medical interventions		
2009 Endocrine Society Guidelines about therapy	X	X
Benefits and risks of endocrine intervention	X (in brief)	X
Potential adverse mental health outcomes of withholding affirmative care as weighed against the potential side effects of treatment		X
Literature on persistence and desistence in order to highlight why endocrine intervention does not begin before puberty		X
Literature on controversy surrounding pre-pubertal social transition		X
Models for informed consent/assent for therapy		X
Learning objective: recognise resources for supporting transgender youth		
Resources for supporting transgender youth		X

Abbreviations: DSM-5, Diagnostic and Statistical Manual of Mental Disorders, fifth edition; GD, gender dysphoria.

Students who asserted interventions to be unethical and ethical performed similarly on knowledge questions

Most students (75%) reported that 80% or more children with GD persist into adolescence, overestimating the persistence data, which varies widely in the literature from 2 to 39%, and revealing an area of controversy in the field.[8]

No statistically significant differences existed in performance on *individual* knowledge questions by training year, with the exception of questions on the time requirement for a GD diagnosis and the potential benefit of spironolactone (see Table 2).

Although not statistically significant, first-year students tended to have the highest knowledge means for questions on: identifying terminology correctly (88%); all psychiatric co-morbidities common to transgender youth (94%); and the diagnostic criteria for GD (90%) (see Table 2). These questions have more to do with distinct definitions and classifications covered extensively in the first-year lecture. The proximity in time in which first-year students had been exposed to these details may explain the better performance.

Although the majority of students (86%, $n = 139$) felt that it is ethical to administer hormonal interventions for these patients, a small number (14%, $n = 23$) reported a belief that interventions are unethical. There was similarity in the number of students per training class who deemed interventions to be unethical: students who asserted interventions to be unethical and ethical performed similarly on knowledge questions overall, as well as on items that, if answered correctly, acknowledged an understanding of the psychiatric co-morbidities and potential benefits of endocrine intervention (see Table 3).

DISCUSSION

After receiving a curriculum on transgender paediatrics, students performed well on a number of knowledge questions and less well on inquiries about *some* pharmacological and diagnostic issues, which may indicate the need to teach these topics more deliberately, with repetition, through medical school. On the question of persistence rates of GD into adolescence, the respondents' overestimation may indicate students' reactions to the controversies within the field. Although overestimating the rate of persistence of GD, the majority successfully avoided the answer choices of 0 and 100%,

Performance on questions concerning the pharmacological management of GD tends to improve over time

Table 2. Response and knowledge item performance by training year

	Year 1	Year 2	Year 3	Year 4	*P* (ANOVA)	*P* (Tukey)
Response: *n* (% of class)	49 (47%)	44 (42%)	30 (30%)	39 (39%)	–	–
Rate of correct answers (M):						
Knowledge questions combined	66	66	69	73	0.854	–
Terminology	88	77	83	72	0.274	–
Time requirement to meet criteria for GD diagnosis	27	25	50	49	0.022*	<.01
Diagnostic criteria for GD	90	82	80	85	0.630	–
Recognise all psychiatric co-morbidities	94	84	87	92	0.405	–
Identify oestrogen as a medical intervention	92	91	87	95	0.695	–
Identify testosterone as a medical intervention	94	93	97	97	0.779	–
Identify GnRHa as a medical intervention	55	64	73	72	0.283	–
Identify spironolactone as a medical intervention	12	48	47	54	0.01*	<.01
Estimate of persistence of GD from pre-puberty into adolescence	27	20	20	33	0.630	–
Identify long-term benefits of medical management of GD	82	80	70	85	0.494	–

Abbreviations: GD, gender dysphoria; GnRHa, gonadotropin-releasing hormone analogs.

Table 3. Students believing medical intervention for gender dysphoria (GD) to be ethical and unethical by performance on knowledge questions*

	Belief in intervention as ethical Mean	Belief in intervention as unethical Mean	*P* (Student's *t*-test)
Performance on knowledge questions combined	72	65	0.533
Recognised all psychiatric co-morbidities with GD	90	87	0.310
Identified long-term benefits of medical management of GD	86	83	0.628

*There was similarity in the number of students per training class who deemed interventions to be unethical (six in the first year; seven in the second year; five in the third year; five in the fourth year), and therefore training year did not seem to be associated with a belief in the ethical nature of medical intervention.

suggesting that students know that persistence cannot be predicted with certainty. Given these results, the persistence of GD might be more carefully covered in the curriculum, with opportunities for students to debate the issues.

Performance on questions concerning the pharmacological management of GD tends to improve over time spent in medical school, which may indicate an overall familiarity with medications gained through clinical experiences in the latter years of medical school. Similarly, the significantly better performance by third- and fourth-year students on the time requirement for GD diagnosis may indicate greater diagnostic acumen gained through clinical experience. On the other hand, the better (but non-significantly so) performance of first-year students on detailed terminology and classification data is likely to be related to the proximity in time of gaining this information *in detail*, which may indicate that intensive attention to these areas should be repeated in the curriculum.

The small number of respondents believing that hormonal intervention for transgender

adolescents was unethical, while recognising the benefits of treatment on global functioning, suggests that knowledge itself may not be responsible for shaping ethical standards. A possible cognitive dissonance between knowledge and beliefs might be better addressed in learning activities that depend less on lectures and more on interactive learning and discussion (e.g. classroom exposure to transgender adolescents and families, and debate on philosophical arguments for and against treatment). Since the survey, such components have been added to the curriculum. Future research should investigate the underlying contributions to differential ethical perspectives on the treatment of transgender youth, as well as the effects of the added experiential learning.

A limitation is that the study involved one medical school. In spite of this, our survey provides a model that may be replicated elsewhere, and results may indicate that offering information alone without experiential learning may be insufficient for helping students to adopt attitudes conducive to effective treatment.

The survey's focus on medical intervention after the onset of puberty is reflective of areas of concentration in our curriculum. Future work may consider investigating student perspectives regarding the treatment of pre-pubertal children with early social transition, as new research suggests that this controversial practice results in superior mental health outcomes, compared with historical studies that did not allow pre-pubertal children to socially transition.[9]

Another limitation is a 40% response rate, which does not permit us to make firm conclusions. Hearing from 162 students, however, offers some direction for continuing and revising our curriculum. A next step would be to conduct pre- and post-intervention tests of knowledge and ethical perceptions using the same survey with new cohorts of students, with greater incentives to participate. A time-series approach would permit the monitoring of changes in knowledge and perceptions as students move through the curriculum, and would give an indication of knowledge retention.

Our hope is that our curriculum implementation and study is informational for institutions delivering or desiring to implement similar curricula.

Information alone without experiential learning may be insufficient for helping students to adopt attitudes conducive to effective treatment

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